AMENDMENTS TO THE CLAIMS

The following is a complete, marked-up listing of revised claims with a status identifier in parenthesis, underlined text indicating insertions, and strike through and/or double-bracketed text indicating deletions.

LISTING OF CLAIMS

1. (Currently Amended) A transmitter, comprising:

an upconverter for converting one frequency signal to another frequency signal, the one frequency signal including in-phase components and quadrature phase components;

a compensator including a <u>plurality of</u> filter units for compensating at least one of gain distortion and phase distortion introduced into the one frequency signal by at least the upconverter, the <u>plurality of filter units including a first set of filter units configured to filter the in-phase components and quadrature phase components, output of the first set of filter units producing at least one of a gain compensated in-phase signal and a phase compensated in-phase signal, and a second set of filter units configured to filter the in-phase components quadrature phase components, output of second set of filter units producing at least one of a gain compensated quadrature-phase signal and a phase compensated quadrature-phase signal the one frequency signal including in phase components and quadrature phase components; and</u>

a compensator constructor, based on a channel model of at least the upconverter that includes an in-phase channel, a quadrature phase channel and cross coupling channels between the in-phase and quadrature phase channels, estimating the in-phase channel, the quadrature phase channel, and the cross coupling channels between the in-phase and quadrature phase components, and constructing filters in the filter unit based on the estimates.

2. (Original) The transmitter of claim 1, wherein

the upconverter is a direct upconverter for directly upconverting a baseband signal to an RF signal; and

the compensator compensates for at least one of gain imbalance and phase imbalance introduced into the baseband signal by at least the direct upconverter.

- 3. Cancelled
- 4. (Previously Presented) The transmitter of claim 2, wherein the compensator compensates for dc offset introduced into the baseband signal by at least the direct upconverter.
- 5. Cancelled
- 6. Cancelled
- 7. (Previously Presented) The transmitter of claim 2, wherein the compensator constructor derives the filters as an inverse of the channel model for the direct upconverter based on the estimates and a cost function, which represents a mean squared error, in the frequency domain, between a desired response of a system including at least the direct upconverter and an actual response of the system including at least the filters and the direct upconverter.

- 8. (Previously Presented) The transmitter of claim 2, wherein the compensator constructor estimates each of the in-phase channel, the quadrature phase channel, and the cross coupling channels between the in-phase and quadrature phase channels based on output from the compensator and a baseband signal derived from output of the direct upconverter.
- 9. (Previously Presented) The transmitter of claim 8, further comprising:

a feedback path including a down converter down converting output of the direct upconverter; and wherein

the compensator constructor receives a signal on the feedback path.

- 10. (Original) The transmitter of claim 8, further comprising:
 - a power amplifier amplifying the RF signal for transmission;
- a feedback path including a down converter down converting output of the power amplifier; and wherein

the compensator constructor receives a signal on the feedback path.

- 11. Cancelled
- 12. Cancelled
- 13. (Previously Presented) The transmitter of claim 1, wherein the compensator compensates for dc offset introduced into a lower frequency signal by at least the upconverter.

14. (Currently Amended) A transmitter, comprising:

a direct upconverter for converting a baseband signal directly to an RF signal, the baseband signal including in-phase and quadrature phase components; and

a compensator including

a first filter for filtering the in-phase component to compensate for at least one of gain imbalance and phase imbalance in the in-phase component,[[;]]

a second filter for filtering the quadrature phase component to compensate for at least one of gain imbalance and phase imbalance in the in-phase component associated with cross-coupling of the quadrature phase component with the in-phase component, [[;]]

a third filter for filtering the quadrature phase component to compensate for at least one of gain imbalance and phase imbalance in the quadrature phase component,[[;]] and

a fourth filter for filtering the in-phase component to compensate for at least one of gain imbalance and phase imbalance in the quadrature component associated with cross-coupling of the in-phase component with the quadrature component.

15. (Original) The transmitter of claim 14, further comprising:

a first adder adding output of the first and second filters;

a second adder adding output of the third and fourth filters; and wherein

the direct upconverter receives output from the first and second adders.

16. (Original) The transmitter of claim 15, further comprising:

a third adder adding a first dc offset to the in-phase component to compensate for dc offset introduced into the baseband signal by at least the direct upconverter; and

a fourth adder adding a second dc offset to the quadrature phase component to compensate for dc offset introduced into the baseband signal by at least the direct upconverter; and wherein

the direct upconverter receives output from the third and fourth adders.

17. (Currently Amended) A method of generating an RF signal, comprising:

up converting one frequency signal to another frequency signal, the one frequency signal including in-phase components and quadrature phase components; and

compensating using a <u>plurality of</u> filter units for at least one of gain and phase distortion introduced into the one frequency signal by at least the upconversion, <u>the plurality of filter units including a first set of filter units configured to filter the in-phase components and quadrature phase components, output of the first set of filter units producing at least one of a gain compensated in-phase signal and a phase compensated in-phase signal, and a second set of filter units configured to filter the in-phase components quadrature phase components, output of second set of filter units producing at least one of a gain compensated quadrature-phase signal and a phase compensated quadrature-phase signal the one frequency signal including in phase components and quadrature phase components;</u>

deriving, based on a channel model of at least the upconverting step that includes an inphase channel, a quadrature phase channel and cross coupling channels between the in-phase and quadrature phase channels, estimates of the in-phase channel, the quadrature phase channel, and the cross coupling channels between the in-phase and quadrature phase components; and constructing filters in the filter unit based on the estimates.

- 18. (Previously Presented) The method of claim 17, further comprising:

 compensating for dc offset introduced into a lower frequency signal by at least the upconversion.
- 19. (Original) The method of claim 18, wherein the up converting step directly up converts a baseband signal to the RF signal.
- 20. (Cancelled)
- 21. (Cancelled)
- 22. (Cancelled)
- 23. (New) The transmitter of claim 1, wherein:

the first set of filter units include a first filter unit to filter the in-phase components and a second filter unit configured to filter the quadrature phase components; and

the second set of filter units include a third filter unit configured to filter the in-phase components and a fourth filter unit configured to filter the quadrature phase components.

24. (New) The transmitter of claim 23, further comprising:

a first adder configured to add the output of the first and second filter units to produce the at least one of the gain compensated in-phase signal and the phase compensated in-phase signal; and

a second adder configured to add the output of the third and fourth filter units to produce the at least one of the gain compensated quadrature-phase signal and the phase compensated quadrature-phase signal.

25. (New) The transmitter of claim 24, further comprising:

a third adder configured to add an in-phase DC component to the in-phase signal; and a fourth adder configured to add a quadrature-phase DC component to the quadrature-phase signal, wherein the in-phase DC component and the quadrature-phase DC component compensates DC offset.

-- End of claim listing --